REMARKS

Claims 1-3 and 5-10 were pending, with claim 4 having previously been canceled, without prejudice or disclaimer. By this Amendment, new dependent claim 11 has been added. Accordingly, claims 1-3 and 5-11 are now pending, with claims 1 and 6 being in independent form.

Claims 1, 2, 6, 7 and 9 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over U.S. Patent No. 6,215,308 to Takekoshi et al. in view of Minas et al. (US 2002/0145426 A1). Claim 3 was rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Takekoshi in view of Minas and further in view of U.S. Patent No. 5,436,607 to Chari et al. Claims 5 and 10 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Takekoshi in view of Minas and further in view of U.S. Patent No. 5,517,121 to Kaufman et al. Claim 8 was rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Takekoshi in view of Minas and further in view of U.S. Patent No. 6,828,792 to Danby et al.

Applicant has carefully considered the Office Action dated June 1, 2006, and respectfully submits that independent claims 1 and 6 are patentable over the cited art, for at least the following reasons.

This application relates to a type of MRI apparatus which utilizes a vertical magnetic field which has a pair of magnets for forming a static magnetic field arranged in a vertical direction with respect to a measurement space into which an object to be examined is inserted. Such a MRI apparatus is often used in interventional MR wherein invasive treatment (such as surgery) is performed while monitoring the MR image. In such procedures, easy access to the object (and more particularly, the imaging portion of the object between the centers of the magnets) for the operator is typically desired, and often plural operators (for example, doctor and assistant) need

such access.

Applicant devised an improved construction for such a MRI apparatus comprising a pair of columns for supporting the upper magnet (installed over the outer parts of the upper magnet) and the lower magnet in the vertical direction, and a bed on which the object is placed, including a bed base and a top plate inserted into the measurement space, wherein the pair of columns is oppositely arranged with respect to a central axis of the upper magnet and the lower magnet, a cross sectional area of one column of the pair of columns is made smaller than that of the other, the bed base is movable along the periphery of the gantry. Each of independent claims 1 and 6 addresses these features, as well as additional features. The subject matter of claim 1 further provides that the bed is disposed at the side of the column with small cross sectional area with respect to a line perpendicular to both (i) a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets, and the top plate is moved along a longitudinal and a transverse direction of the bed base. The subject matter of claim 6 further provides that the bed base extends longitudinally along a line angled to both (i) a line perpendicular to a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets, the top plate is moved along the longitudinal and the transverse direction of the bed base, and the bed is disposed so that the top plate is inserted from a position in the vicinity of the column with large cross sectional area toward the center of the pair of magnets. Such configurations allow improved access to the patient.

Takekoshi, as understood by Applicant, proposes a MRI system which includes a lower body 40, an upper body 70 which is disposed above the lower body 40, a pair of opposed right and left support posts 62 and 64 which interconnect the lower body 40 and the upper body 70, a bed 10 is disposed at one side of the two support posts 62 and 64 and adjacent to the lower body

40 through a connecting portion 42. In the MRI system proposed by Takekoshi, the patient is placed on the bed 10, and is transferred or loaded to the lower body 40.

As acknowledged in the Office Action, Takekoshi does not teach or suggest a pair of columns for supporting the upper magnet (installed over the outer parts of the upper magnet) and the lower magnet in the vertical direction, wherein the pair of columns is oppositely arranged with respect to a central axis of the upper magnet and the lower magnet, and a cross sectional area of one column of the pair of columns is made smaller than that of the other (claims 1 and 6). The Office Action also implicitly acknowledges that Takekoshi does not teach or suggest that (I) the bed is disposed at the side of the column with small cross sectional area with respect to a line perpendicular to both (i) a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets (claim 1), and (II) the bed base extends longitudinally along a line angled to both (i) a line perpendicular to a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets (claim 6).

In addition, Takekoshi, contrary to the contention in the Office Action, does not teach or suggest that the bed base is movable along the periphery of the gantry.

Takekoshi, column 3, lines 45-47 (cited in the Office Action) states as follows:

> The upper surface of the lower body 40 is disposed in opposed relation to the lower surface of the upper body 70, and the lower body 40 and the upper body 70 contain respective opposed inclined magnetic field coils, irradiation coils, receiving coils and magnetic poles, and circular yokes 47 and 79 for these parts are also contained respectively in the lower body 40 and the upper body 70, as shown in FIG. 6. The lower body 40 has the bed connecting portion 42 formed at a central portion of the front side thereof for connection to the bed 10. A pair of outer peripheral surfaces (arcuate surfaces) 46 and 48 of the lower body 40, which lie between one end of the bed connecting portion 42 and the right support post 62 and between the other end of the bed connecting portion 42 and the left support post 64, respectively, are substantially part of a cylindrical surface having its axis disposed on an axis 41 of the lower body 40. With this construction, the doctor or the like can move the patient from either of the right and left outer peripheral surfaces 46 and 48 according to the need, and also when the patient to be examined requires the

> attendance of a nurse or a medical treatment, a necessary medical instrument, such as an oxygen mask and an instillator, can be applied to the patient from the right and left outer peripheral surfaces 46 and 48. The lower body 40 has a circular shape, and that surface of the bed connecting portion 42 facing the bed 10 is straight so as to accurately connect the circular lower body 40 to the bed and also to lessen the burden on the patient during transfer of the patient to the lower body 40.

Thus, Takekoshi clearly teaches that with the bed and bed connecting portion 42 dissecting (that is, splitting into two equal halves) the outer peripheral region between the supports, the doctor can approach the patient from one side of the bed and the assistant can approach the patient from the other side of the bed, and thereby implies that when the bed and bed connecting portion 42 is stationary in such a positoning, no movement would be required. Moreover, Takekoshi does not disclose or suggest means for moving the bed base along the periphery of the gantry.

Minas, as understood by Applicant, is directed to an open MRI apparatus having axially-spaced pairs of magnet coils supported by a pair of diametrically opposed supports.

Minas, like Takekoshi, does not teach or suggest, however, that (I) the bed is disposed at the side of the column with small cross sectional area with respect to a line perpendicular to both (i) a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets (claim 1), and (II) the bed base extends longitudinally along a line angled to both (i) a line perpendicular to a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets (claim 6).

Contrary to the contention of the Office Action, Minas [0003] does not disclose or suggest that the bed can be disposed anywhere between the two columns. Minas [0003] states as follows:

> "[0003] In order to provide the desired openness and create an open gap around a patient imaging region, a pair of magnet coil assemblies can be separated into two

axially-spaced half sections. The half sections of the magnet produce high attractive magnetic forces which must be reacted with a structural support system that separates and supports the half sections and prevents the magnet coils from collapsing upon one another."

The remaining references were cited against dependent claims of this application only.

Chari, as understood by Applicant, proposes an open magnet having two magnet assemblies arranged in a spaced apart, parallel relationship to define a working space therebetween and are attached to a C-shaped support frame which is rotatively mounted to a pedestal member. Chari was cited in the Office Action as purportedly proposing an open MRI magnet in which the support is bulged outward in the center.

Danby, as understood by Applicant, proposes MRI equipment which includes a patient support device that is operable to accept a patient who enters the patient receiving space in an upright position. Danby was cited in the Office Action as purportedly proposing support columns with a rectangular cross-section.

Kaufman, as understood by Applicant, proposes an MRI system with side access to an image volume, wherein two magnet poles are connected and physically supported by a pair of magnetically permeable columns to form a magnetic circuit. Kaufman proposes rotating the symmetry axis of the magnet to be non-perpendicular with respect to the longitudinal axis of the patient transport. However, the cross sectional areas of the two columns are the same. Kaufman simply does not disclose or suggest having a column with small cross sectional area and disposing a bed close to the column. With the structure proposed by Kaufman, it is not possible to access from both sides of the patient's feet, when the patient is inserted with the head near the imaging volume.

None of the above cited references discloses or suggests that the bed is disposed at the side of the column with small cross sectional area in order to improve accessibility to a patient

from any of various positions around the columns.

In the subject matter of claim 1 of the present application, the bed is disposed at the side of the column with small cross sectional area. With this structure, the accessibility to the patient from positions around the column with small cross sectional is improved as compared to the system of Kaufman because the side of the column with small cross sectional area has more free space than in the configuration of Kaufman. In addition, one can access the patient from both sides of the patient's feet when the patient is inserted with the head near the imaging volume.

In the subject matter of claim 6 of the present application, the bed is disposed so that the top plate of the bed is inserted from a position in the vicinity of the column with large cross-sectional area toward the center of the pair of magnets. With this structure, the accessibility to the patient on both side of the column with the small cross sectional area is maximized. This improvement of accessibility owes to the fact that the cross sectional area of the column is small.

Applicant simply does not find disclosure or suggestion in the cited art of a MRI apparatus comprising a gantry including a pair of upper magnet and lower magnet arranged oppositely and concentrically in a vertical direction, sandwiching a measurement space into which an object to be examined is inserted, and a pair of columns for supporting the upper magnet (installed over the outer parts of the upper magnet) and the lower magnet in the vertical direction, and a bed on which the object is placed, including a bed base and a top plate inserted into the measurement space, wherein the pair of columns is oppositely arranged with respect to a central axis of the upper magnet and the lower magnet, a cross sectional area of one column of the pair of columns is made smaller than that of the other, the bed base is movable along the periphery of the gantry, the bed is disposed at the side of the column with small cross sectional area with respect to a line perpendicular to both (i) a line connecting the centers of the pair of

columns and (ii) a line passing through the center of the pair of magnets, and the top plate is moved along a longitudinal and a transverse direction of the bed base, as provided by the subject matter of independent claim 1.

Likewise, Applicant does not find disclosure or suggestion in the cited art of a MRI apparatus comprising a gantry including a pair of upper magnet and lower magnet arranged oppositely and concentrically in a vertical direction, sandwiching a measurement space into which an object to be examined is inserted, and a pair of columns for supporting the upper magnet (installed over the outer parts of the upper magnet) and the lower magnet in the vertical direction, and a bed on which the object is placed, including a bed base and a top plate inserted into the measurement space, wherein the bed base is movable along the periphery of the gantry, and the bed base extends longitudinally along a line angled to both (i) a line perpendicular to a line connecting the centers of the pair of columns and (ii) a line passing through the center of the pair of magnets, and the top plate is moved along the longitudinal and the transverse direction of the bed base, and wherein the bed is disposed so that the top plate is inserted from a position in the vicinity of the column with large cross sectional area toward the center of the pair of magnets, as provided by the subject matter of independent claim 1.

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claims 1 and 6, and the claims depending therefrom, are patentable over the cited art.

The attention of the Examiner is directed to the Information Disclosure Statement filed concurrently herewith, by which JP 1997-299352 is brought to the attention of the Examiner.

JP 1997-299352 proposes that two columns are disposed with offset from a horizontal line passing through the magnetic field center and have the same cross sectional area. Patient table 71 can swing along circumference 12 centered on the magnetic field center so as to

insert a patient into gantry 13 toward the magnetic field center at any angle within opening 110.

However, JP 1997-299352 does not disclose or suggest columns having different cross sectional area and a bed disposed at the side of the column with small cross sectional area, as provided by the subject matter of claims 1 and 6 of the present application. Because the two columns are disposed offset from the horizontal line passing through the magnetic field center, when the patient is inserted into the gantry, there is almost always enough free space for the doctor or operator to access the patient from either side so that the operator is not aware of the column with small cross sectional area and the bed disposed close to the column with small cross sectional area.

In view of the remarks hereinabove, Applicant submits that the application is now in condition for allowance, and earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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